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ABSTRACT

A study investigated lexical decision-making among Dutch-English bilinguals in the auditory modality. Subjects, bilinguals at three proficiency levels (intermediate, high, and near-native) were presented with 40 cognate and 40 non-cognate word pairs, a similar number of English and Dutch distractors, and a similar number of nonsense words in each language. An additional cue, pronunciation by a man or woman, was used to distinguish Dutch and English cognates. Intra- and interlingual repetition of words was also used as a variable. In three experiments, three subject groups were used: 32 Dutch secondary school students; 32 Dutch university student of English; and 16 Dutch learners with near-native English skills. Results of the three experiments suggest that for bilinguals of intermediate proficiency, there was a priming effect for cognates but not for non-cognates. For high-proficiency and near-native bilinguals, there was a priming effect for both cognates and non-cognates. The findings are examined in terms of previous research and theory concerning bilingual storage of vocabulary. (MSE)

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Proficiency and the bilingual lexicon

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Contents

In this presentation subjects of three proficiency levels will be compared, namely bilinguals of **intermediate** and **high proficiency** and **near-native** bilinguals. The languages under investigation were Dutch and English. We conducted three lexical decision experiments using the so-called **repetition priming paradigm**. In these experiments the same stimuli were used. The experiments only varied in the kind of subjects the stimuli were presented to. It will be shown that proficiency is an important factor in the organisation of the bilingual lexicon, but that context of acquisition is also important.

I will start with an explanation of the **framework** I will be working with. Then, the **lexical decision** task and the **repetition** paradigm will be explained. Thirdly, some **results** of previous experiments will be discussed. Fourthly, the **experiments** will be presented; using subjects of different proficiency levels. Finally, I will discuss the **implications** for a theory of the organisation of the bilingual lexicon.

Framework

In the past, research on the bilingual mental lexicon concentrated on the question whether the concepts and/or word forms of the two languages are stored together or not. It all started with Weinreich's *Languages in Contact*. Weinreich postulated three types of bilingualism: **subordinative** bilingualism, **compound** bilingualism and **coordinate** bilingualism. For subordinative bilinguals the word forms of L1 and L2 are connected, the concept is part of the L1; for compound bilinguals the concepts of L1 and L2 are shared; for coordinate bilinguals there are separate concepts in the L1 and L2. Subordinative bilingualism is likely to apply when a new language is learned through another language. Compound bilingualism is a situation typical of foreign language learning a the school setting, or of the acquisition by a child who grows up in a home where two languages are spoken more or less interchangeably by the same people and in the same situations. Coordinate bilingualism is characterized as a development of learning two languages in two different situations, for instance at home *vs.* at school, or as the result of second language learning through immersion in the culture of another language community, thereby relying on translation as little as possible.

So Weinreich uses context of acquisition to explain the differences between bilinguals.

The lexical decision task

A frequently used paradigm to investigate the organisation of the bilingual lexicon is the lexical decision task. The lexical decision task can be carried out in both the **visual** and the **auditory** modality. In the visual modality letter sequences will be used; in the auditory modality phoneme sequences will be used. In the experiments to be reported in this paper, the auditory modality will be used. Therefore, the lexical decision paradigm will be explained using auditory examples.

During a lexical decision task subjects have to decide whether phoneme sequences that are presented to them are real words or nonsense words. They make this decision by pushing a button; the yes-button when it is a real word and the no-button when it is a nonsense word. In the experiments latencies and error percentages are typically used to test hypotheses about the organisation of the mental lexicon. This works as follows:

When a phoneme sequence is presented to a subject, he will look whether he has access to the word form. When it is a real word, first the word form, and then the connected concept are activated. Only when both word form and concept are activated, the subject makes the lexical decision: Yes, it is a word. When the phoneme sequence is not a real word, no word form with connected concept can be activated. This leads the subject to push the no-button.

The repetition priming paradigm

When the repetition priming paradigm is used, the same stimulus is presented for a second time after several unrelated trails. Normally, reaction times are shorter on the second presentation of a stimulus. This is due to the fact that when a word form or concept is activated once, its activation level will stay higher than before. This is called the residual activation. As a consequence, when a word form or concept is accessed for a second time, less activation will be needed before it is selected. This will lead to a shorter reaction time. This effect is called *intralingual repetition*. In the case of intralingual repetition both the concept and the word form have already been activated.

In the literature on lexical priming an intralingual repetition effect has been found over and over again. Therefore, one could state that intralingual repetition priming is a prerequisite for a repetition priming experiment to be valid.

In a *bilingual* repetition experiment one can use translation equivalents at the second presentation. For instance, by first presenting the English word GARDEN and then, after several other items, its Dutch translation equivalent TUIN. When subjects now react faster to TUIN than when this word is presented in a non-primed condition, an *interlingual repetition effect* for Dutch is obtained. In the example GARDEN-TUIN the speeding-up of the selection process is caused by the fact that the concept is activated twice.

More specifically, one obtains an intralingual repetition effect by subtracting the reaction times on the second presentation of a word in a certain language (the intralingual condition) from the first presentation of that word in the same language (the baseline condition). To determine an interlingual repetition effect, the reaction times measured on the second presentation of a word preceded by a presentation of its translation equivalent (in the interlingual condition) are contrasted with the reaction times measured in the baseline condition.

Results of previous experiments

An interesting topic in the organisation of the bilingual lexicon is the difference between so-called *cognate* and *non-cognate* words. Cognates are words with a more or less similar form and meaning in both languages, like English HAND and Dutch HAND. Non-cognates (traditionally called: translation equivalents) are words which have the same meaning, but a different form in both languages, like English AIR and Dutch LUCHT. The difference between cognate and non-cognate words is of interest since interlingual repetition is generally believed to occur always for cognates and not for non-cognates (De Groot 1992). For instance Cristoffanini, Kirsner and Milech (1986), when using fluent speaking Spanish-English bilinguals found a repetition effect for cognates but not for non-cognates. Also Kerkman and De Bot (1989) found a repetition effect for cognates and not for non-cognates for the intermediate proficient Dutch-English subjects in their experiment. It was concluded that word forms are stored together, while concepts are not.

However, there have been a number of counterexamples to this position. First, interlingual repetition for cognates has not always been found. Second, sometimes interlingual repetition for non-cognates has been reported.

To start with the first counterexample, Kerkman and De Bot (1989) did not find any interlingual repetition effects, neither for cognates, nor for non-cognates. Their subjects were near-native Dutch-English bilinguals. They claim that this finding has to do with the proficiency level of the subjects. When subjects are very highly proficient, the lexicons of the two languages will be separated. Therefore, there will be no interlingual repetition priming effect for the cognates.

With regard to the second counterexample, De Bot, Cox, Ralston, Schaufeli and Weltens (1995) have reported an interlingual repetition effect for non-cognates. They used very proficient Dutch-English bilinguals and near-native subjects.

Following Kerkman and De Bot, we want to hypothesize that **proficiency level** is a crucial factor in the organisation of the bilingual lexicon. Although very little is stated about the absolute proficiency levels in the articles reported, we assume that the proficiency level of the bilinguals used by Cristoffanini *et al.* is lower than the proficiency level of the subjects of De Bot *et al.* and Kerkman and De Bot. In addition, it might be that the near-natives of Kerkman and De Bot were of a higher level than the near-natives of De Bot *et al.* Speculating over the organisation of the bilingual lexicon, this would mean the following:

1 For intermediate proficient bilinguals there is only a connection at the word form level. There is interlingual repetition priming for cognates, but not for non-cognates. They are subordinative bilinguals.
2 For highly proficient bilinguals concepts **and** word forms are connected. There is interlingual repetition priming for both cognates and non-cognates. They are compound bilinguals.
3 For near-native bilinguals concepts and word forms are stored **separately**. There is no interlingual repetition priming for cognates, nor for non-cognates. They are coordinate bilinguals.

These hypotheses will be investigated using subjects of clearly separated proficiency levels: bilinguals of an intermediate and high proficiency level and near-native bilinguals.

EXPERIMENTS

In all experiments the same materials, design and procedure were used.

Materials

A total of 80 Dutch-English word pairs were selected as experimental items, divided into 40 cognate and 40 non-cognate ones. In order to reduce the saliency of the repetition, a total of 160 filler words were added to the experimental items, 80 Dutch words and 80 English words. Furthermore, 160 pseudo-words were constructed for each language. In this way an equal number of potential yes- and no-responses was obtained. The pseudo-words were derived from real words by changing one or more phonemes in different positions in the word, while obeying the morpho-phonetic rules of the language in question.

Because the differences between the cognates of both languages are very small, an extra cue was added to distinguish the different languages. Therefore, the Dutch stimuli were pronounced by a man and the English stimuli were pronounced by a woman.

Design

In total three dependent variables were used: stimulus language, repetition and word type. The first variable, stimulus language, was manipulated by using two languages, Dutch and English. The second variable, repetition, was varied in intralingual and interlingual repetition. The third variable was word type. It was manipulated by using two sets of stimuli, cognates and non-cognates.

Procedure

Subjects were tested individually. The stimuli were presented through headphones. At the beginning of each session the subject listened to a Dutch instruction read by the experimenter. Then, the subjects were presented with two practice blocks. These blocks, one in Dutch and one in English, consisted of 20 stimuli each. After this, the real experiment started, consisting of four blocks of 160 stimuli. The procedure during the practice and experimental blocks was the same: at the beginning of each block the experimenter informed the subject which language would be used. The entire session lasted approximately one hour. The subjects were paid for their participation.

EXPERIMENT 1

The bilinguals of an intermediate proficiency

In this experiment 32 Dutch secondary school students participated. At the time of the experiment, they all had had about 300 hours of education in English.

Results

A significant intralingual repetition effect for both stimulus languages was obtained. This means that the experiment as such was valid.

We also found an interlingual repetition effect. There was as much interlingual repetition priming in English as in Dutch. However, there was an interaction between cognateness and the repetition effect. It turned out that there was interlingual repetition priming for cognates, but not for non-cognates.

EXPERIMENT 2

The bilinguals of a high proficiency

In the second experiment bilinguals of a high proficiency were participating. They were 32 Dutch university students of English. They were all in the third year of their studies; before entering university, and had had at least 600 hour of education in secondary school.

Results

A significant intralingual repetition effect for both stimulus languages was obtained. So, again the experiment was valid.

In addition, an interlingual repetition effect was found. There were no interactions. This means that there was as much interlingual repetition priming in English as in Dutch, and the interlingual repetition effects for the cognates and for the non-cognates were, statistically speaking, equally large.

EXPERIMENT 3

The near-native bilinguals

In this experiment the subjects were of a near-native level. They were 16 excellent learners of English, mostly working in the English department at the university and in tertiary education. For purposes of their studies, they all had been immersed into the English language and culture for several months.

Results

First, a significant intralingual repetition effect was found for both English and Dutch. Second, an interlingual repetition effect was found. In this experiment too, we did not find any interactions between the interlingual repetition effect and stimulus language or word type. This means that there were no differences in priming between English and Dutch, and that there was as much interlingual repetition for the cognates as for the non-cognates.

Conclusion

When we combine the results of all three experiments, the following picture emerges. For bilinguals of an intermediate proficiency, there is priming for cognates but not for non-cognates. For bilinguals of a high proficiency and near-native bilinguals, there is priming for both cognates and non-cognates.

Apparently, for bilinguals of an intermediate proficiency, only when there is overlap at the word form level **and** at the conceptual level interlingual repetition priming will occur. For bilinguals of a high proficiency and near-native bilinguals overlap at the conceptual level is enough to cause an interlingual repetition effect.

Looking at the framework of Weinreich this means that the intermediate proficient bilinguals in our experiments are of the subordinative type. The highly proficient and near-native subjects are of the compound type. There are no coordinate bilinguals involved. Probably, coordinate bilingualism does only occur when the languages are learned in two different situations from the beginning. In addition to proficiency level **context of acquisition** is likely to be an important factor in the organisation of the bilingual lexicon.

So, in a theory of the bilingual lexicon both proficiency level and context of acquisition have to be taken into account.

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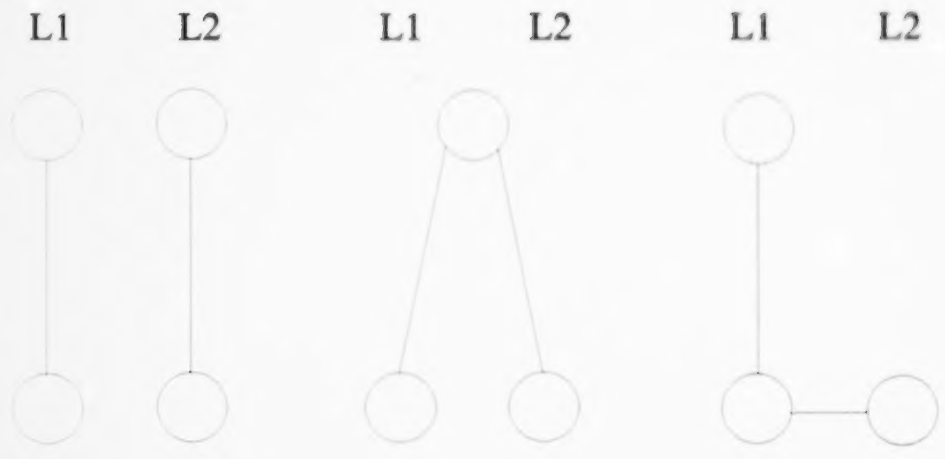
L1
L2
L1
L2
L1
L2
CONCEPTS
WORD FORMS
COORDINATE
COMPOUND
SUBORDINATIVE

Interlingual repetition effects

researchers	*proficiency/languages*	*cognates*	*non-cognates*
Cristoffanini et al. (1986)	intermediate Spanish-English	+	-
De Bot et al. (1995)	very proficient Dutch-English	+	+
De Bot et al. (1995)	near-native Dutch-English	+	+
Kerkman & De Bot (1989)	near-native Dutch-English	-	-

STIMULI

STIMULI	LANGUAGE	
	English	**Dutch**
40 cognates	*hand*	*hand*
40 non-cognates	*garden*	*tuin*
80 filler words	*rose*	*boom*
160 pseudowords	*aclostic*	*wunder*

	Stimulus language		**Repetition**	**Word Type**
condition	**baseline**	**repeated**		
	Dutch	Dutch	intralingual	cognates
				non-cognates
	English	Dutch	interlingual	cognates
				non-cognates
	English	English	intralingual	cognates
				non-cognates
	Dutch	English	interlingual	cognates
				non-cognates

Results intermediate proficient bilinguals

Intralingual repetition:

baseline	996 ms
repeated	950 ms
effect	**46 ms***

Interlingual repetition:

Cognates		*Non-cognates*	
baseline	1009 ms	baseline	989 ms
repeated	978 ms	repeated	997 ms
effect	**31 ms***	effect	**-8 ms**[n.s.]

Results highly proficient bilinguals

Intralingual repetition:

baseline	910 ms
repeated	849 ms
effect	**60 ms**

Interlingual repetition:

Cognates		*Non-cognates*	
baseline	922 ms	baseline	912 ms
repeated	889 ms	repeated	888 ms
effect	**34 ms***	effect	**24 ms***

Results near-native bilinguals

Intralingual repetition:

baseline	860 ms
repeated	809 ms
effect	**50 ms***

Interlingual repetition:

Cognates		*Non-cognates*	
baseline	875 ms	baseline	858 m
repeated	838 ms	repeated	849 m
effect	**37 ms***	effect	**10 ms***

Overall interlingual repetition effects of Dutch-English bilinguals

Proficiency	*cognates*	*non-cognates*
Intermediate	+	-
Highly proficient	+	+
Near-native	+	+